It is, however, difficult for a man of small leisure to search through the maps, sections, explanations, and memoirs to see whether there is anything which immediately concerns him. In the annual report of progress such men find a short account of what has been done and often a forecast of what line of research it is proposed to follow next—as, for example, in the description of the coal-bearing strata in the basin of the Amman.

It would, however, be a mistake to suppose that the results achieved are of interest to geologists only. From the summary of progress just issued, it may be seen that the work appeals to a much wider public than would at first appear. It contains a record of accurate observations on the relation to one another of the great masses of which the earth's crust is made up—very different from the *a priori* reasoning as to how they ought to behave with which we have so often had to be content. If we turn to the very first page of the introduction, in which the able director of the Survey gives a sketch of what he and his men have done, we read that they have demonstrated that the arrangement of the different kinds of rock proves that there have been movements by which slices of sedimentary and igneous matter, of heavy basic and lighter acidic rock, have been thrust in, so that they now appear in alternating layers over large areas, and further that these earth movements have crushed and kneaded and drawn out the constituents of the rock so that its structure is quite different from that which they have reason to infer it once had from the changes observed as they trace each mass across the country.

The physicist and astronomer will find in the survey publications the results of observations on earth movements recorded by a man like Mr. Harker, who is not only one of the highest authorities in petrography, but also a mathematician of the first order; while geographers will note with interest the inferences which are forced upon clear-headed and experienced observers like Mr. Strahan, who are trained, as few ordinary travellers are, to watch every indication of change of rock structure, and to trace the guiding influence of systems of displacement upon the rivers and other denuding agents which have moulded the surface of the land.

In the Survey memoirs biologists will find treatises, by men like Woodward, Clement Reid, and Lamplugh, dealing with ancient climatal and physical conditions which have varied, as inferred from the flora and fauna as well as from other indications, with the great geologic changes of the earth's crust.

On the staff of the Survey are many men of world-wide reputation who are approaching these large questions from many different points of view, and fully realise what large superstructures may be built up on the facts which they lay down. Carping critics talk of the "uncertainties of geology"; that is because the public is sometimes told what working hypothesis is suggested by evidence which is known to be incomplete. It is not necessary for pioneers to be always repeating the *certainties,* and the Summary of Progress lets the public follow the work as it is going on.

NOTES.

THE council of the Royal Meteorological Society has awarded the Symons gold medal to Prof. Julius Hann, of Vienna, in recognition of the valuable work which he has done in connection with meteorological science. The medal will be presented at the annual meeting of the Society on January 20, 1904.

A BUST of John Dalton, presented to the Manchester Literary and Philosophical Society by Sir Henry E. Roscoe on the occasion of the centenary of the announcement of the atomic theory, was unveiled on October 20. The secretary read the following letter from Sir Henry Roscoe:—"I desire to present to the Literary and Philosophical Society of Manchester a bronze bust of Dr. Dalton, as a memento of the many years of pleasant intercourse which I have in past days spent in converse with its members, and as a recognition of the honour which the Society has done me by electing me as an honorary member, and in bestowing upon me its Dalton Medal. The bust is the work of a distinguished sculptress, Miss Levick, and I believe that all those who have seen it agree with me in esteeming it a powerful and lifelike work of art. It will give me great satisfaction to hear that the Society accept my gift, and that they value the bust as a work of art and as a reminiscence of the donor." The president, in formally unveiling the bust, observed that it was a happy coincidence that this meeting took place on the anniversary of the date when Dalton communicated to the Society his paper on the absorption of gases by water, in which was given the first hint of the atomic theory.

THE zebra stallion Matopo, which has been described and figured by Prof. Cossar Ewart in his book "The Penycuik Experiments," and was the sire of some interesting zebra-horse hybrids, is dead. This zebra was purchased some time ago by Mr. Assheton-Smith, Vaynol Park, Bangor, who was hopeful that he might find it possible to repeat some of Prof. Ewart's experiments, but unfortunately his expectations have not been realised. Whilst retaining the skin, he has presented the skeleton of the zebra to the University College of North Wales, where it will form a handsome addition to the zoological collection. It may also be noted that to this college Prof. W. A. Herdman, F.R.S., of Liverpool, recently made a donation of some fishes from Ceylon and Indo-Malaya which he collected when in the East investigating the pearl fisheries of Ceylon. Prof. D'Arcy Thompson, C.B., Dundee, has also presented a skeleton of the somewhat rare sea otter (Enhydra) from Alaska. By presentation and purchase a valuable zoological collection, which is under the care of Prof. Philip J. White, has gradually been formed at the college.

DR. DAWSON TURNER has been awarded a Keith prize by the Royal Scottish Society of Arts for papers upon improved Röntgen apparatus and other electrical matters.

AT an auction sale of rare, valuable and standard books by Messrs. Hodgson and Co., Chancery Lane, on October 21. a complete set of Curtis's *Botanical Magazine*, from the commencement in 1787 to the present month, realised the sum of 120*l.*

THE opening meeting of the Institution of Electrical Engineers will be held on November 12, when the premiums awarded for papers read or published during the session 1902–1903 will be presented, and the president, Mr. Robert Kaye Gray, will deliver his inaugural address.

MR. MARCONI, in company with Captain H. B. Jackson, has gone to Gibraltar to carry out further experiments for the Admiralty. It is hoped to be able to open communication with Gibraltar before losing touch with Portsmouth.

ACCORDING to the daily papers, the Post Office authorities are about to make experiments with the de Forest system of wireless telegraphy. Dr. Lee de Forest has come over from America to superintend the experiments; the system, in which an electrolytic conductor is used in place of the ordinary coherer, is in considerable use in America.

A FORTNIGHT ago we were able to record the fact that a speed of 125½ miles an hour had been attained by the Siemens car in the high-speed trials which are being carried on at Berlin. Last Friday this record was beaten, and a speed of 130½ miles an hour attained. It is said that a higher speed than this is not desired. The passing of the car at full speed seems to have created a strong impression on a large crowd of sightseers who witnessed the experiments from Dahlwitz Station.

WE regret to see the announcement of the death of Dr. C. T. Hudson, F.R.S., president of the Royal Microscopical Society from 1888 to 1890, and joint author of Hudson and Gosse's "Rotifera." Dr. Hudson was born in 1828, and was fifteenth wrangler in the mathematical tripos of 1852. From 1855 to 1860 he was headmaster of Bristol Grammar School, and from 1861 to 1881 of Manilla Hall, Clifton. He was elected a fellow of the Royal Society in 1889, chiefly on account of his work on Rotifers, concerning which he was the chief authority. The genus Pedalion, discovered and described by him, was a very remarkable and important contribution to animal morphology; Dr. Hudson was also the discoverer of numerous other new genera and species of Rotifera, described in the publications of various scientific societies.

AN announcement is made in a Government resolution on the annual report of the Survey of India for 1901–2 that the necessity for effectively revising and keeping up to date the maps now in existence, as well as of providing fresh ones, has been forced upon the Government of India. "We can only hope," says the *Pioneer Mail,* "that there may be no half measures, and that the reform may be thorough, for assuredly the need is more crying than most can have any idea of."

ACCORDING to the *Westminster Gazette,* Mr. F. du Cane Godman has recently presented to the British Museum (of which he is a trustee) a collection of nearly 30,000 specimens of beetles, following on a previous donation of 50,000. The present collection consists mainly of representatives of the family Elateridæ, or "ship-jacks," the bulk being from Central America. The collection in the Museum is now the finest in the world, and housing space is a problem. Our contemporary makes a curious mistake in referring to the fact that 150,000 *specimens* of beetles are already described, and that the annual addition to the British Museum collection averages 400 *specimens*; in both cases, of course, *species* are meant.

A REUTER telegram from Wellington, dated October 25, states that the Antarctic relief ship *Morning* has left Lyttelton to join the *Terra Nova,* the relief ship for the *Discovery,* at Hobart. In connection with the relief of the Nordenskiöld Antarctic Expedition, the *Times* reports that the Swedish vessel *Frithjof,* the French steamer *Le Français,* and the Argentine gunboat *Uruguay* will meet at Ushnaia on November 1, and will then proceed to Seymour's Island, and from thence to Snowhill, Dr. Nordenskiöld's proposed base.

A CORRESPONDENT, referring to Prof. W. H. Everett's letter on rocket lightning in our last issue, directs attention to a closely similar phenomenon observed in London between 2 and 3 a.m. on the morning of October 16. From the south-eastern horizon of a clear sky, a "wriggling stream" of bluish-white light shot up in a vertical direction and broke off short without spreading. It would be interesting to know if any other observer witnessed this display, and if a thunderstorm occurred that night anywhere to the south-east of London within twenty or thirty miles.

COMMANDER R. E. PEARY has been granted leave of absence in order to make one more attempt to reach the North Pole. In a letter to the Secretary of the U.S. Navy, published in the *National Geographic Magazine* for this month, Mr. Peary outlines the plan he proposes to adopt. He intends to make his winter camp fully one hundred miles north of his previous winter quarters, so that when he is ready to start in spring he will be a hundred miles nearer his goal. The distance from Peary's proposed winter camp near Cape Joseph Henry to the North Pole and back again is less than the average distance of four sledging trips which he has made. Mr. Peary proposes to start in July, 1904, to reach Cape Joseph Henry with his vessel in the fall of that year, and to make his dash for the Pole in 1905. In case he does not reach the proposed winter camp in 1904, he will spend 1905 in reaching it, and attempt to reach the North Pole in 1906.

THE fourteenth International Congress of Americanists will be held at Stuttgart on August 18–23, 1904, under the presidency of Prof. Karl von den Steinen. The congress is concerned with the history, culture, linguistics, and mythology of the various aboriginal races of America, and generally with the archæology and ethnography of the New World. Correspondence referring to anthropology and ethnography should be addressed to Prof. Karl von den Steinen, Berlin-Charlottenburg, Hardenbergstrasse 24, and that referring to archæology, discovery, and Central America to Prof. Eduard Seler, Steglitz bei Berlin, Kaiser Wilhelmstrasse 3. The general secretary is Prof. K. Lampert, Stuttgart, Archivstrasse 3.

THE volume referred to in the foregoing note affords convincing evidence of the interest shown in scientific subjects in New Zealand, and it is not unnatural to find that men of science in that colony are beginning to ask that scientific principles may influence the national system of education. Mr. Hill, in a paper on technical education, read before the Hawke's Bay Institute, rightly maintained that "the study of natural science should be fostered even beyond the public school course, and this can readily be done by the introduction of botany, geology, agricultural chemistry, and other cognate subjects into the advanced or secondary course. The maintenance by the Government of technical schools and schools of science and agriculture would give prestige to such institutions, and these, with the university colleges, should supply all the academic, scientific, and technical training that is wanted for the professions and the pursuit of every specialised form of industrial work."

THE council of the Royal Society will proceed on November 5 to the election of a Joule student for the period 1903–5. The studentship will be awarded for investigations in those branches of physical science more immediately connected with Joule's work. Applications from candidates will be received by the Assistant Secretary, Royal Society, Burlington House, London, W.

THE first number of vol. ix. of the *Bulletin* issued by the Società Sismologica Italiana gives the rules of that Society, a list of its members, and a continuation, up to the end of 1901, of the well-known earthquake register compiled at the Central Meteorological Office in Rome. The late appearance of this publication arises from the fact that with the Italian records there are incorporated corresponding records which have been collected from seismological stations throughout the world. In this publication we therefore have not only entries relating to disturbances confined to the Italian peninsula, but also of practically all the large earthquakes of the world.

WE have received from the Cambridge Scientific Instrument Company its new catalogue of Duddell oscillographs. These instruments were described in detail in NATURE of December 6, 1900 (vol. lxiii. p. 142). Since that time several improvements have been made in their construction which have the effect of making them more trustworthy instruments, and better able to withstand the somewhat rough usage which they are likely to meet with in engineering work. We note also that a double permanent magnet oscillograph is now on the market; this instrument has two sets of strips, and is thus able to show the waveforms of current and P.D. simultaneously; hitherto the portable instrument has only been made with one set of strips. Amongst the illustrations to the catalogue are a number of excellent reproductions of oscillograph records, which serve to show the variety of purposes for which the instrument is suited. One has only to turn to any of the more recent papers dealing with alternate current working to see how important a part the oscillograph is now playing and is destined to play in the future in this branch of electrical engineering.

WE have also received from the Cambridge Scientific Instrument Company a pamphlet describing Prof. Callendar's apparatus for measuring the mechanical equivalent of heat, which was recently described before the Physical Society, and a second pamphlet relating to the application of electric resistance thermometry to meteorology. This latter paper sets forth some of the cases in which the use of resistance thermometers is peculiarly suitable, as, for example, the measurement of water temperatures or underground temperatures. The method can be used with much advantage for measuring or recording temperatures at some distance from the observatory, and has the additional recommendation that the thermometer itself need not be disturbed or approached when the reading is taken. We pointed out some of the other uses of these thermometers in these columns a few weeks ago.

IN a recent number of the *Bulletin de la Société d'Encouragement pour l'Industrie nationale*, M. Charles Henry has an interesting paper on the luminous efficiency of oil lamps and flames generally. He shows that the efficiency increases with the intensity, at first very rapidly, as the intensity rises from 1 to 2 carcels, and then more slowly, becoming practically constant at 3 carcels. The same has been shown to be true for arc lamps, the law of variation being nearly the same in both cases, only the arc lamp naturally varies over a much wider candle-power range; the efficiency does not become a maximum, in fact, until about 600 carcels. If the efficiencies at their respective maxima are compared, the arc lamp is found to be approximately five times as good as an oil lamp, one carcel-second being obtained for an expenditure of 70 watts in the one case and of 320 in the other; this is allowing for the losses in the boiler, engine and dynamo generating the current, and represents, therefore, the actual superiority of the arc over the oil lamp. If, however, the efficiencies at equal candle-power are compared, the oil lamp is three times as good as an arc—but, of course, an arc of 3 candle-power is never used in practice. The efficiency of the oil lamp may be improved 25 to 40 per cent. by surrounding the lower portion of the flame with a copper ring to prevent loss of heat by convection.

IN the *Field* of October 17, Mr. G. Renshaw announces that he has found in the museum of the Royal College of Surgeons a skull of the extinct South African blaauwbok (*Hippotragus leucophaeus*), which is believed to be the only known specimen in existence.

THE *Proceedings* of the Royal Irish Academy for May contain an important paper by Dr. G. H. Carpenter on the relationships between the classes of Arthropods. The author considers that group to have been derived from a single stock, and since typical insects, crustaceans, and arachnids possess the same number of segments, the ancestral type must likewise have been definite in this respect. Consequently, millepedes and the like must be aberrant types in which the segmentation has been abnormally increased. Probably the ancestral forms were naupliform (*i.e.* larval) crustaceans, and not, as commonly believed, well-developed annelid worms.

THE *Illustrated London News* of last week (October 24) contains a special supplement devoted to the first part of an account, illustrated by reproductions from original photographs, of Major Powell-Cotton's recent hunting expedition in Eastern Equatorial Africa. One of the objects of the expedition was, we believe, to obtain specimens of the okapi, but although the celebrated traveller and big-game hunter has been unsuccessful in this respect, he has succeeded in mapping out an extensive tract of hitherto unexplored country, and has likewise acquired much valuable information with regard to the natives and the fauna. It was during this expedition that the two fine giraffes now mounted in the Natural History Museum were obtained. Special interest attaches to the traveller's discovery of a spot to which elephants resort when about to die, the habit on the part of these animals of having a "dying ground" being paralleled in the case of the South American guanaco. The cave-dwellers of Mount Elgon appear to have made a more favourable impression on Major Powell-Cotton than they did on their discoverer, Sir Harry Johnston. One of the photographs shows a native stalking hartebeests behind an ass on the head of which has been fixed the scalp and horns of one of these antelopes. The conclusion of the account will appear in this week's issue.

AT Rossitten, in eastern Prussia, large numbers of crows and rooks are caught alive in nets every year during the two migration seasons. The director of the station of the German Ornithological Society at Rossitten proposes to try a curious experiment with these birds. Small metal rings bearing a number and date will be attached to one foot of each of them, after which they will be liberated and permitted to proceed upon their own paths of migration. Notices have been sent all over Germany requesting that when any of these birds are shot the foot and the ring attached to it may be returned to the director of the "Vogelwarte" at Rossitten. It is quite possible that some of them may stray even as far as the shores of Great Britain, and if this should happen it is hoped that the director's request may be attended to. An accurate record will be kept at Rossitten of the dates of the liberation of every bird and of the locality whence its foot is returned, and it is expected that some interesting deductions will be made from the information thus obtained.

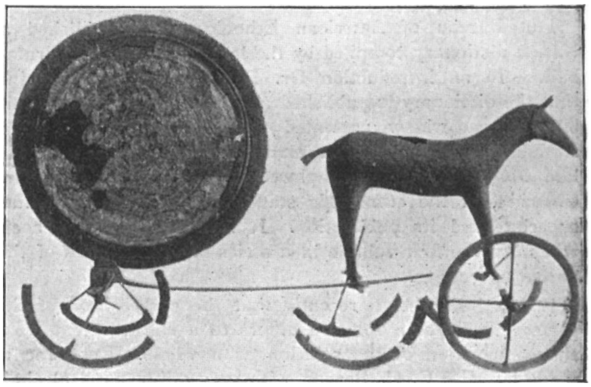
The small, but well-ordered, zoological garden at Bâle is well worthy of a visit. It is situated in the new quarter of the city beyond the railway station, and has the advantages of a good soil and a clear stream of water running through it. The new lion-house, which will shortly be ready for occupation, is planned on an extended scale, but will not be quite so large as those of London and Berlin. There will be a set of external cages for the animals on the south side, but the interior of the building on the north side will be appropriated to the exhibition of reptiles. There is a fine herd of the American bison, which has frequently bred in this garden, and very good examples of the elk and reindeer, neither of which seem to do well in England. The special pet of the director, Dr. Hagmann, is a young female orang, which has been living at Bâle in good health for more than three years, and is remarkably tame and intelligent. She obeys orders given in German, but has not yet learned to reply to them in that language.

The geology of the country near Chichester is described in a memoir of the Geological Survey by Mr. Clement Reid, F.R.S., with contributions by Mr. G. W. Lamplugh and Mr. A. J. Jukes-Brown. The memoir, which is accompanied by a colour-printed map (sheet 317), deals with a portion of the South Downs in Sussex, with the picturesque regions of Midhurst, Petworth and Pulborough on the north, and the low-lying fertile tracts of drift gravel and brick-earth on the south. The formations described range from the Wealden to the London Clay, together with Clay-with-flints, certain marine gravels, and other superficial deposits. The price of the memoir is one shilling, and of the map one shilling and sixpence. Both may be obtained from any agent for the sale of Ordnance Survey maps, or through any bookseller from the Ordnance Survey Office, Southampton. For educational purposes this and other memoirs in the same series are invaluable.

The second part of the general report and statistics for 1902 relating to mines and quarries, edited by Prof. C. Le Neve Foster, F.R.S., and published as a Home Office Blue-book, deals with questions of labour. It gives the facts relating to persons employed and accidents at mines and quarries in the United Kingdom, and to the enforcement of the Mines and Quarries Acts. In 1902, 1061 separate fatal accidents occurred in and about the mines and quarries of the United Kingdom, causing the loss of 1172 lives. Compared with the previous year, there is a decrease of fourteen in the number of fatal accidents and of fifty-seven in the number of lives lost. Three-fourths of the fatal accidents by explosions of fire-damp or coal-dust were due to naked lights, the illegal use of matches, or the illegal opening of a safety-lamp. The worst disaster of the year was the explosion at MacLaren Colliery, Abertysswg, Monmouthshire, where sixteen persons lost their lives and eighteen were injured. In connection with this explosion, Prof. Le Neve Foster remarks, "fortunately the roads were well watered, or otherwise the loss of life would probably have been very much larger"; and in this contention he is supported by Mr. Martin, one of H.M. Inspectors of Mines who reported on the disaster, and concluded his report with the following words:—"This is perhaps the first practical proof of artificial watering limiting the effects of what would otherwise have proved a widespread and much more disastrous affair. It is certainly an object lesson for all colliery managers." Owing to the large number of accidents occurring at quarries from the use of explosives containing nitro-glycerin when in a solid or frozen state, it has been thought desirable to circulate special notices to be posted up on the door of the magazine or store from which the men fetch their explosives. The notice directs that all cartridges made of dynamite, gelignite, blasting gelatin, and other explosives containing nitro-glycerin must always be thawed (in a properly designed warming pan) before use during the months of December, January, February, and March, and also at any other times if the cartridges are not in a soft or pasty condition.

A peculiar form of the basidiomycetous fungus *Lentinus lepideus* is described by Mr. W. G. Smith in the *Journal of Botany* (October), in which numerous clavaria-like branches spring from a central club-like portion. Mr. E. G. Baker completes in this number his systematic arrangement of the Indigoferas of tropical Africa.

The current number (October) of the *Reliquary and Illustrated Archaeologist* contains some notes by Mr. W. R. Prior on an image of the sun found last autumn at Trundholm, in northern Zeeland, and two pictures of the object, one of which is here reproduced on a reduced scale, by permission of the publishers, Messrs. Bemrose and Sons, Ltd. The image is 1 foot 1½ inches broad and 8 inches high, and was found in fragments about six inches under the surface of the ground. It was easily reconstructed by Dr. Sophus Müller, director of the National Museum at Copenhagen, and a full description of the object has appeared in Danish.



Sun Image found at Trundholm, Denmark.

"It has been clearly proved," says Mr. Prior, "an image of the sun being dragged round on a chariot as an object of worship, an idol of the sun-worship dating from about 1000 B.C., and the best of its kind found anywhere, both as regards design and execution. In Egyptian and Oriental mythology, as well as in Grecian, the sun was represented as a round disc, often inlaid with gold. Several pictorial representations of the sun are known from the same period, but none that has any close resemblance to this find. Everything seems to indicate that the find belongs to the older Bronze age, and is of purely Scandinavian origin in its rich ornamental style and artistic workmanship, which appear in northern bronzes of that period."

In order to obtain flowers out of their natural season, it is possible to retard their growth at an early stage by placing the plants in cold, dry houses, and then to force them later under the influence of heat and moisture, or it is possible to stimulate the young buds into premature development by subjecting them to the effects of ether. M. A. Maumené, a strong advocate of the etherisation system, discusses its scientific and practical aspects in the *Revue scientifique*. He maintains that not only do plants develop more quickly after being etherised, but that development is more regular and complete.

In Japan the custom prevails of burning down yearly, tri-yearly, or at longer intervals the tracts of ground known as "hara," this name being applied to the bare hillsides which have been denuded of trees. One of the first products on these lands is a grass known as "kaya," *Miscanthus sinensis*, and it is with the idea of increasing this crop that the lands are burnt. This fallacy is combated by Mr. O. Shishido in the *Bulletin* of the College of Agriculture, Tokio, where he points out that the *hara*, although favourably situated, are now practically unproductive areas. In the same journal Mr. H. Shirawasa indicates the development of the oil in the camphor-tree which crystallises out into camphor.

A useful little book has been published by the Royal Geographical Society entitled "Hints on Outfit for Travellers in Tropical Countries," by Dr. Charles F. Harford. The hints are of just the practical kind that intending travellers will find serviceable.

A sixth edition of Prof. W. H. Burr's "The Elasticity and Resistance of the Materials of Engineering" has been published by Messrs. John Wiley and Sons, of New York, and Messrs. Chapman and Hall, of London. More than half the book is new, and the advanced matter relating to the general theory of elasticity in amorphous solid bodies, and the theories of torsion and flexure, have been placed at the end of the book as an appendix.

The Bureau of American Ethnology has published a Natick dictionary compiled by the late Dr. James H. Trumbull. In an introduction Dr. Edward E. Hale explains that the dictionary is published as it was left by Dr. Trumbull, whose widow presented the MS. to the American Antiquarian Society. The manuscript was passed to the late Major Powell, who placed it in the hands of Dr. Gatschet, of the ethnologic staff of the Bureau, who has superintended its publication. It is hoped that the book will form the first volume in a series of vocabularies of the native languages.

It has been shown recently that the composition of the surface layers of a solution differs to a slight extent from the composition of the solution as a whole. Experiments made by Miss C. C. Benson with very dilute amyl alcohol, which readily gives rise to a durable foam on shaking, show that this foam is also different in composition from the main solution, the proportion of alcohol being slightly greater in the foam than in the rest of the liquid. The composition of the solutions was determined by surface tension measurements by the drop method.

The problem of turning to practical use the free nitrogen of the atmosphere for the purposes of agriculture and industry is one which has excited attention for many years past. According to a recent communication of Dr. Frank, of Charlottenburg, the fixation of atmospheric nitrogen on a technical scale can be effected through the agency of the carbides of the alkaline earth metals. Barium carbide is especially suitable for the purpose, and by the absorption of atmospheric nitrogen is converted directly into barium cyanide. The reaction with calcium carbide proceeds differently, the product obtained being calcium cyanamide, which, however, by heating with water under high pressure is easily converted into calcium carbonate and ammonia. Experiments have, moreover, shown that the calcium cyanamide can be used directly as a means of supplying nitrogen to the soil.

Although the analogy between asymmetric carbon and nitrogen in regard to optical rotation is assured by the fact that the activity of the nitrogen compounds can be explained by a simple extension of the theory of van 't Hoff and Le Bel, yet previous experiences seem to point to the analogy being very incomplete. The instability and the tendency of the active forms to undergo spontaneous racemisation are conspicuously characteristic of the nitrogen compounds. These properties no doubt depend upon the readiness with which nitrogen passes from the pentavalent into the trivalent form, a transformation which at once destroys the spacial asymmetry. An interesting paper dealing with the subject is published by Dr. Wedekind in the current number of the *Zeitschrift für physikalische Chemie*.

An investigation of the best conditions for the electrolytic refining of copper has recently been carried out by Messrs. F. J. Schwab and I. Baum, an account of which is given in the October number of the *Journal of Physical Chemistry*. The factors which have been taken into consideration are the cost of the power necessary to precipitate a tank of copper with different current densities and at different temperatures, the cost of heating the tank, the deterioration of the electrolyte, the interest charge on the copper in the tank, and the quality of the copper deposited. As the result of a large number of series of experiments, in which the influence of these factors and their correlation were examined, the authors come to the conclusion that in order to operate a plant most economically and to secure the best financial returns, copper should be refined in covered tanks at a temperature of 70° C., with a current density of 3½–3¾ amperes per square decimetre.

The additions to the Zoological Society's Gardens during the past week include two Chestnut-breasted Finches (*Donacola castaneothorax*), a Bicheno's Finch (*Estrelda bichenovii*), fourteen Banded Grass Finches (*Poephila cincta*), eight Gouldian Finches (*Poephila gouldiae*) from Queensland, two Modest Grass Finches (*Amadina modesta*), fourteen Chestnut-eared Finches (*Amadina castanotis*), two Undulated Grass Parrakeets (*Melopsittacus undulatus*), a Peaceful Dove (*Geopelia tranquilla*), a Graceful Ground Dove (*Geopelia cuneata*) from Australia, presented by Mrs. Alfred H. Houlder; an American Bittern (*Botaurus lentiginosus*), captured at sea, presented by Mr. Yeo; two Chameleons (*Chamaeleon vulgaris*) from North Africa, presented by Mr. G. T. Coleman; a Hocheur Monkey (*Cercopithecus nictitans*) from West Africa, a Grey Seal (*Halichoerus grypus*) from the West Coast of Ireland, a Red-fronted Lemur (*Lemur rufifrons*) from Madagascar, an Adelaide Parrakeet (*Platycercus adelaidae*) from Australia, deposited; two Great Kangaroos (*Macropus giganteus*) from Australia, a Banded Cotinga (*Cotinga cincta*) from Brazil, purchased; a Hybrid Waterbuck, between (*Cobus unctuosa* ♂ and *Cobus ellipsiprymnus* ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

Astronomical Occurrences in November:—

Nov. 3. 3h. 45m. to 7h. 2m. Transit of Jupiter's Sat. III. (Ganymede).
7. 11h. 23m. Minimum of Algol (β Persei).
9. 8h. 43m. to 9h. 28m. Moon occults λ Geminorum (Mag. 3·6).
10. 7h. 26m. to 10h. 44m. Transit of Jupiter's Sat. III. (Ganymede).
,, 8h. 12m. Minimum of Algol (β Persei).
14–16. Epoch of Leonid Meteors (Radiant 150° + 22°).
15. 1h. Venus in conjunction with the Moon. Venus 0° 55′ N.
,, Venus. Illuminated portion of disc = 0·429.
16. 6h. 11m. to 9h. 53m. Transit of Jupiter's Sat. IV. (Callisto).
17. 11h. 12m. Transit (ingress) of Jupiter's Sat. III. (Ganymede).
27. 23h. Venus at greatest elongation (46° 44′ W.).
30. 9h. 55m. Minimum of Algol (β Persei).